HD-IVS

High Definition Video Assist for 35 mm Film

High Definition Integrated Video System

The HD-IVS is a breakthrough product that uses innovative digital technology to create high definition video assist images for the ARRICAM and ARRIFLEX 435 film cameras.

Wide dynamic range, excellent color reproduction and low noise are combined with ARRI's unique Ground Glass Cancellation (GGC) technology to create beautiful, high resolution preview images. Powerful processing adds extra versatility through electronic de-squeezing of anamorphic images, for 2x or 1.3x squeezed images. In all shooting situations the HD-IVS provides a superior picture for the director and cinematographer on the set to judge each take while shooting 35mm film.

A screen grab of a test image captured with the standard definition IVS

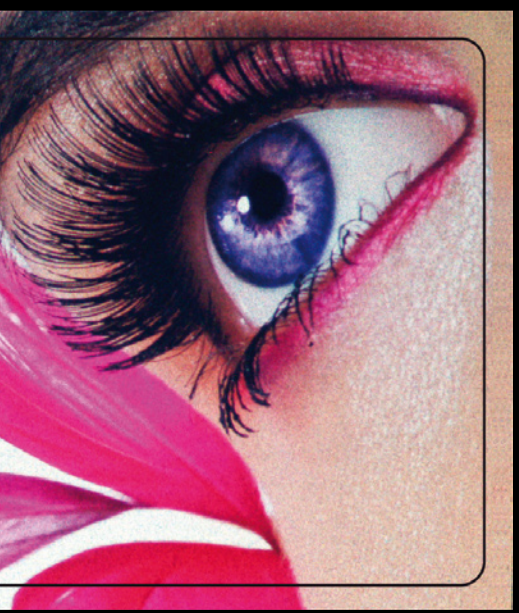
A screen grab of a test image captured with the HD-IVS, with Ground Glass Cancellation (GGC) turned off

Video Assist - Quality Control on the Set

It is critical for productions to have the best preview tools available, since any issues discovered on the set save time and money. Interestingly, however, the recording medium that can produce a real 4K output - 35 mm film - has had a relatively low quality standard definition video assist image up until now.

As part of ARRI's continued support for film technology, the High Definition Integrated Video System (HD-IVS) changes all that. The HD-IVS uses advanced digital sensor and image processing technologies to create brilliant high definition images. This greatly improves the crew's ability to evaluate their work on the set and saves precious time.

A screen grab of a test image captured with the HD-IVS, with Ground Glass Cancellation (GGC) turned on




ARRIMAG 120
ARRI
FEM-2
ARRIFLEX 435 XTREME
MP
14


ARRICAM LT
STEADIMAG 120/400
ARRI
MP
14


ARRICAM ST
ARRICAM ST
MP
14

The HD-IVS for the ARRIFLEX 435 ES, 435 Advanced and 435 Xtreme

The HD-IVS for the ARRICAM Lite

The HD-IVS for the ARRICAM Studio

Main Features

■ **HD Video Assist for**
- ARRICAM Studio and Lite
- ARRIFLEX 435 ES, 435 Advanced, 435 Xtreme

■ **Unprecedented Image Quality**
- 1920 x 1080 high resolution output
- 3 stops more dynamic range than standard definition IVS
- Ground Glass Cancellation (GGC) for a clean image
- less noise through optimized exposure control
- sharp, high contrast image
- excellent color reproduction

■ **Screen Capture**
- capture of individual HD images onto a USB stick
- load captured images back into HD-IVS for compare function

■ **Anamorphic Preview**
- built-in electronic de-squeezing of 2x or 1.3x squeezed anamorphic images

■ **3x HD-SDI outputs**
- 4:2:2 color sampling
- with overlay, without overlay and switchable
- progressive, progressive segmented frame or interlaced output
- 23.976, 24, 25, 29.97 or 30 fps

■ **Retains Popular IVS Features**
- simple user interface
- flicker free operation
- design and optics closely integrated into film camera
- integrated frame line inserter
- integrated text inserter
- compare life to stored image
- automatic and manual gain control
- white balance: indoor, outdoor, manual and one-push-white

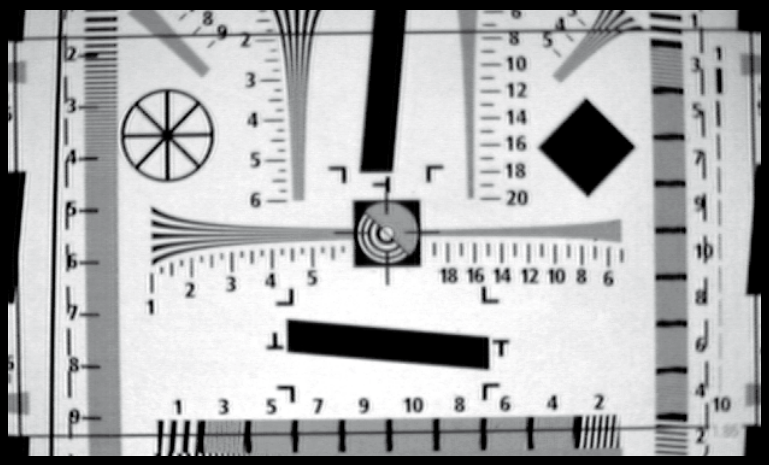
More Details

A new 1920 x 1080 CCD sensor and powerful processing electronics supply three 1920 x 1080 4:2:2 HD-SDI outputs at all the standard HD scanning options (progressive, progressive segmented frame or interlaced) and frame rates (23.976, 24, 25, 29.97 or 30 fps). Small details, which may be overlooked on a standard definition video assist, can now be seen clearly. In addition, a higher resolution provides far better judgment of focus right on the set.

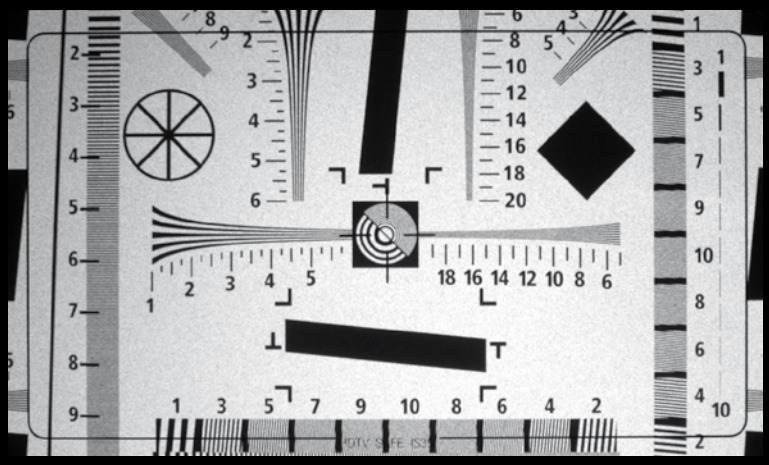
More Dynamic Range

The HD-IVS custom designed processing hardware and software is based on the know-how gained through the ARRIFLEX D-21 development. Its unique internal 12 bit processing path delivers three stops more dynamic range than present on traditional standard definition video assists. While no video assist can accurately depict the enormous exposure latitude of film, the HD-IVS comes closer than ever. The HD-IVS shows more details in shadow and highlight areas which leads to a better evaluation of the whole image.

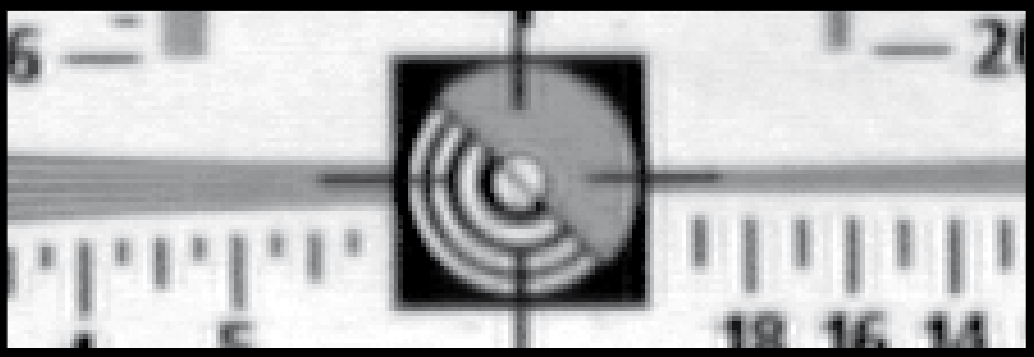
Standard definition IVS image

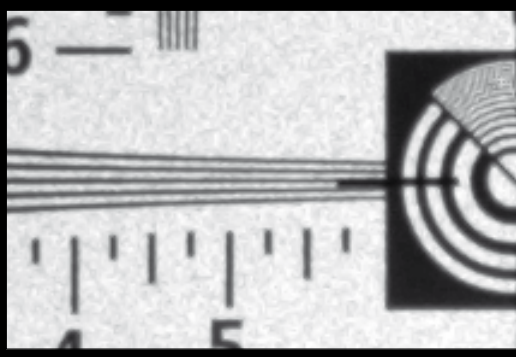


HD-IVS image



Standard definition IVS image enlargement





Less Distraction through Ground Glass Cancellation

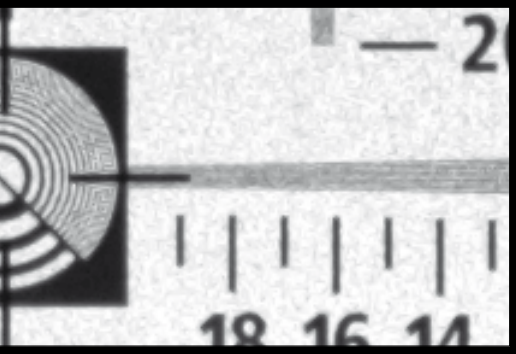
All video assists capture the image they see on the ground glass of the film camera; this ensures that framing and the impression of depth of field are identical between the film negative and the video assist image. The ground glass is an integral part of the optical viewfinder, a feature of 35 mm film cameras much loved by camera operators. Unfortunately, the ground glass also creates a visible texture on traditional video assists.

By recording one or a few images of neutral grey whenever a new ground glass is placed into the camera or an extreme wide angle lens is used, the HD-IVS knows the precise ground glass texture and can use its powerful image processor to remove it from the images. This Ground Glass Cancellation (GGC) technology delivers clean and sharp preview images without any distracting texture.

HD-IVS without Ground Glass Cancellation (GGC)

HD-IVS with Ground Glass Cancellation (GGC)

HD-IVS image enlargement without GGC



HD-IVS image enlargement with GGC

A screen grab from the HD-IVS,
with Ground Glass Cancellation (GGC) on

Less Noise, High Sensitivity and More Color

The best video assist image is the result of a perfect combination of the aperture setting of the video assist lens (iris) and the electronic amplification of the video signal (gain). A new, fully motorized and automated iris always strives to stay wide open, thus keeping gain at its minimum and thereby reducing noise and image artifacts. The resulting brightness of the image can still be set with manual buttons.

High performance, noise optimized electronics work closely with the new sensor for a high sensitivity of the HD-IVS without increasing objectionable noise. Thus even a night shoot will be accompanied by brilliant video assist images.

And last but not least, the new sensor and internal image processing deliver much improved color reproduction.

A screen grab from the HD-IVS, with Ground Glass Cancellation (GGC) on

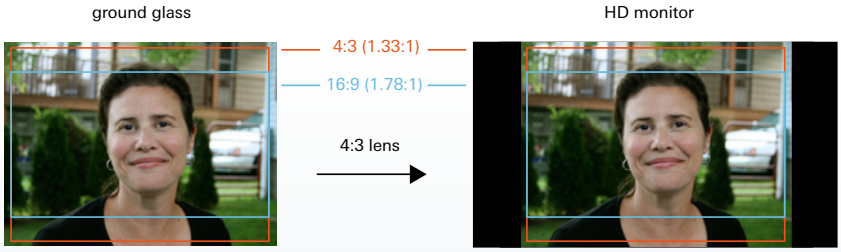
Old and New Features for an Efficient Workflow

The HD-IVS retains all popular features of the traditional standard definition IVS, including simple operation, flicker free mode, close integration with its host film camera, built-in frame line and text inserter (showing, when used with ARRICAMs and newer 435 cameras: speed, battery voltage, shutter, time code, user text line and camera status), automatic or manual exposure control and various white balance options.

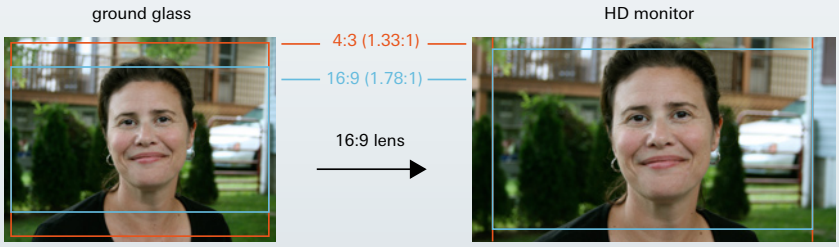
To increase the efficiency on the set, the HD-IVS can now also capture HD still images onto a USB stick. These images show the same depth of field and angle of view as the images captured on film, and so are perfect for continuity and as a basis for the cinematographer's communication with the lab. Previously stored images can be fed back into the HD-IVS, to be superimposed over the live HD-IVS images for perfect alignment with a previous take. This COMPARE feature has proven extremely useful for commercials, table top and stop-motion cinematography.

Two Lenses for All Formats

Two dedicated prime lenses are available for the HD-IVS and should be available in each rental house to cover all shooting formats. The 4:3 lens is optimized for taller aspect ratios such as Super TV and anamorphic formats. The entire 4:3 ground glass image is displayed on an HD monitor at 1440 x 1080 pixel resolution, leaving black vertical bars to the left and right. These black bars optionally display metadata or the on-screen menu.



The 16:9 lens is optimized for aspect ratios of 16:9 or wider. A 16:9 aspect ratio image from the ground glass is displayed on an HD monitor at 1920 x 1080 pixel resolution. While this would cut into the image of tall formats such as Super TV or anamorphic (see orange lines in the image below), it is perfect for wider formats such as HDTV or 1.85:1.



The use of two prime lenses ensures that the maximum aperture is maintained at all times, which would not be possible with a zoom lens. The two prime lenses can be exchanged by the camera rental house.

A Clear Upgrade Path

Existing standard definition IVS units can be replaced with the new HD-IVS on ARRICAM cameras within a few minutes. On the ARRIFLEX 435 it is necessary to initially re-wire a few cables in the camera body, which can be done by all authorized ARRI service centers, or by trained electronic technicians. From then on, switching 435 video assists takes as little time as it does on the ARRICAMs.

Technical Data

	HD-IVS		
	ARRICAM Studio	**ARRICAM Lite**	**435 ES/Advanced/Xtreme**
Size	255 mm x 60 mm x 8 0mm 10' x 2.4' x 3.1'	190 mm x 110 mm x 80 mm 7.5" x 4.3" x 3.1"	220 mm x 200 mm x 65 mm 8.7" x 7.9" x 2.6"
Weight	1060 g/2.3 lbs	TBD	TBD
Power draw	19 W		
Output resolution [1]	1920 x 1080		
BNC 1 output	HD-SDI without graphic overlay		
BNC 2 output	HD-SDI with graphic overlay		
BNC 3 output	HD-SDI switchable with or without graphic overlay		
Internal processing bit depth	12		
Output bit depth	10		
Color sampling	4:2:2		
Output modes	Progressive, Progressive Segmented Frame or Interlaced		
Frame rates	23.976, 24, 25, 29.97, 30 fps		
Options	Lens for 4:3 or lens for 16:9 image content on HD monitor		
Electronic anamorphic compensation	spherical, 2x anamorphic de-squeeze, 1.3x anamorphic de-squeeze		
White balance	Indoor, Outdoor, Manual and One-Push-White		
Gain	Automatic and Manual		

[1] The HD-IVS always outputs a 1920 by 1080 HD signal. When using the 16:9 lens, 1920 x 1080 pixels contain image content. When using the 4:3 lens, 1440 by 1080 pixels contain image content, the other pixels are black ("pillar box").

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